REMARKS

This amendment is being made in response to the Office Action having a mailing date of November 3, 2003. Claims 16-29 are amended. In particular, independent claims 16 and 23 are amended to recite certain distinctive features. New claims 30-32 are added. No new matter has been added. Claims 1-15 are non-elected claims. With this amendment, claims 1-32 are pending in the application.

In the Office Action, the Examiner acknowledged the applicants' election of claims 16-22 and that claims 1-15 are non-elected claims. The Examiner has stated that he would consider whether claim 16 is generic or not over the non-elected claims, if and when claim 16 becomes allowable. If claim 16 is allowed and is found to be generic over the non-elected claims, the applicants respectfully request the Examiner to allow them to amend the non-elected independent claims 1 and 8, if necessary, to include at least some of the parallel amendments that were made to claim 16 that made claim 16 allowable.

In the Office Action, the Examiner objected to claim 29 because its dependency should be changed to claim 28. Claim 29 has been amended appropriately. Moreover, the specification is amended as shown to correct informalities.

In the Office Action, claims 16-29 were rejected under 35 U.S.C. § 102(e) as being anticipated by Guetz (U.S. Patent No. 6,091,777). For the reasons set forth below, the applicants respectfully request the Examiner to reconsider and to allow all of the pending claims.

A disclosed embodiment will now be discussed in comparison to the applied references. Of course, the discussion of the disclosed embodiment, and the discussion of the differences between the disclosed embodiment and subject matter described in the applied references, do not define the scope or interpretation of any of the claims. Instead, such discussed differences are intended to merely help the Examiner appreciate important claim distinctions discussed thereafter.

As described in the background section of the present application, providing video data to client devices in a wireless environment is very problematic. There are multiple different formats that can be supported. Moreover, different types of client devices have different types of characteristics, such as processing capability, display screen resolution, memory capacity, and so

forth. Another problem is attributable to communication channel characteristics. As is known by persons skilled in the art, the characteristics of any given communication channel (such as the bandwidth of the channel) can dynamically change based on a number of factors, including number of users, environmental conditions, integrity of the channel, noise level, and other factors. These various problems make it impractical to send a single output video stream (*e.g.*, an output video stream having the same format, resolution, bit rate, frame rate, etc.) to all of the client devices in a wireless environment, since an output video stream that may be suited for one wireless device may be ill-suited for another wireless device.

Accordingly, an embodiment of the invention provides a technique to adapt a single input video stream into a plurality of different output video streams. Each output video stream is optimized according to the capabilities of the client device that will be receiving that particular output video stream and also optimized based on the characteristics of the communication channel that will be used to carry that video stream to the respective client device(s). Therefore, it is possible for different client devices to receive video streams that have different resolution, frame rate, bit rate, color, encoding formats, and the like, with each of these video streams thus being customized or optimized to their respective client devices.

According to one embodiment, compressed or uncompressed input video data (*see*, *e.g.*, page 23, lines 9-12 of the present application) is received by a processing unit, such as at a server at a back-end remote from the client devices. Data regarding the input video stream can be directly derived from the input video stream, such as by examining the input video stream at the server to directly deriving its frame rate, bit rate, resolution, color format, encoding format, and other characteristics (*see*, *e.g.*, page 13, lines 4-13). Additionally, data associated with the desired video output streams can be received from the client devices (*see*, *e.g.*, page 13, lines 14-32 of the present application). That is, each client device can provide data pertaining to its resolution requirements, memory capacity, processing capability, and so forth. Conditions or characteristics of the communication channel that is to carry the output video streams can also be determined using techniques that would be familiar to those skilled in the art, and provided to the server.

According to one embodiment, a plurality of different transcoders are provided to each generate an output video stream that is different from output video streams generated by other transcoders. Each transcoder determines the manner in which the input video stream is to be adapted, based at least in part on either or both the characteristics of the communication channel or the characteristics of the respective client device that is to receive the output video stream. In an example architecture, a bank or plurality of transcoders can be present in the server, to receive a single input video stream, and then to adapt the input video stream into a plurality of different or unique output video streams, each output video stream being tailored or optimized for the client device that is to receive it. Use of the multiple transcoders are described, for example, on page 27, line 30 through page 28, line 2 of the present application. Page 28, lines 3-9 further describes an embodiment where the output streams of video can be provided at the same time, or simultaneously, to different client devices.

Other features are provided by various embodiments. One embodiment provides a way to dynamically change the characteristics of the output video stream, in response to changes in the channel conditions or client device conditions. *See, e.g.*, page 5, lines 12-18 of the present application. Bit rates, frame rates, resolutions, and the like can be decreased as appropriate, or increased in other situations where the bandwidth permits further optimization. Moreover, it should be noted that an embodiment of the invention does not make any assumptions about the type of input video data that is to be received. Rather, an embodiment can directly determine the characteristics of the video from the input video, such as by detecting its bit rate, frame rate, resolution, color scheme, and the like. By being able to directly determine the characteristics of the incoming video data, which can change from one input video stream to another over the course of time and multiple video inputs, an embodiment allows the transcoding into the plurality of output video streams to be fully optimized and efficient since the characteristics of the initial data set (input video data) are known and which are used as the basis for adaptation.

Guetz, in contrast to what the applicants have disclosed, provides a scalable video delivery system, which provides a single/same output video stream to all client devices. There are not multiple unique output video streams that are produced using different transcoding

processes, such as disclosed by the applicants. More specifically, Guetz provides a base video layer and additional layers of video data that are multiplexed to provide a data stream that can be distributed. This system of using different layers can be compared to the system of Chaddha, wherein a base visual level of Guetz is provided along with higher levels of video resolution. *See, e.g.*, column 5, lines 50-54 of Guetz. Similarly, Guetz provides client-side processing as compared to server-side processing. *See, e.g.*, column 5, lines 64-66 of Guetz wherein the recipient user may determine the level of visual image desired and select the layers of data streams to be utilized. Therefore, it is the client device that makes the determination and the selection of which layers to use, and not the server.

A significant distinction between Guetz and what is disclosed by the present applicants is that the single output data stream of Guetz is commensurate with the available bandwidth of the transmission channel and to the receiver resources of the least capable client user. *See, e.g.*, column 6, lines 34-37, and the abstract of Guetz. Therefore, there is inefficient customization and optimization in Guetz. Since each client device receives the same video stream from the server, wherein the video stream is commensurate with the capabilities of the least capable client user, only those client devices that have capabilities comparable with the least capable client user will receive optimum transmission. The other client devices will be receiving video data that is well below their optimum quality capabilities. The technique of Guetz is therefore clearly different from what the applicants have disclosed, since only a single identical output video stream is provided to all client devices by Guetz.

Independent claim 16 has been amended to recite "dynamically changing characteristics of an input video stream to meet requirements for a plurality of different output video streams . . ." (emphasis added). Independent claim 16 is further amended to recite code configured to direct the processor to characteristics of the frames of data in response to the respective requirements of the output video streams, to provide different characteristic changes for each output video stream. Claim 16 is further amended to recite that the encoding of the characteristic-changed frames is respectively performed to form each of the output video steams in their respective encoding format.

As discussed above, these are features that are not disclosed, taught, or suggested by Guetz. Guetz does not provide a plurality of different output video streams. Rather, Guetz provides a single and identical output video stream to each client device. Moreover, Guetz does not disclose, teach, or suggest providing different characteristic changes for each output video stream. As disclosed in Guetz, Guetz involves sending a single identical video stream to all client devices, such that the output video stream is commensurate with the least capable client device, rather than providing different output video streams to respective client devices. Accordingly, amended claim 16 is allowable over the references of record.

Independent claim 23 is amended to recite dynamically changing characteristics of an input video stream to meet requirements for a plurality of different output video streams. The claim is further amended to recite that different characteristics are provided for each output video stream and that the characteristic-changed frames are respectively encoded to form each of the plurality of output video streams. Nowhere are such features disclosed, taught, or suggested by Guetz. Guetz provides a single output video stream to all client devices, wherein the output video stream is commensurate with the client having the least capabilities. Accordingly, the client devices of Guetz cannot and do not respectively receive different output video streams from the server. Claim 23 is now allowable over the cited references.

Amendments are made to certain dependent claims to clarify the distinctive nature of the subject matter recited therein. For example, certain dependent claims are amended to change "reducing" to --changing-- to clarify that some characteristics (or combination thereof) may be increased rather than decreased, if conditions in the communication channel or client device permit, for example. A few more of these amendments will be discussed next.

Independent claim 17 is amended to recite that the spatial bandwidth is changed, in response to the spatial bandwidth requirements, to any resolution based at least in part on the respective client device characteristics. Because Guetz only provides a single output video stream to all clients that is commensurate with the least capable clients, there is no way Guetz can tailor the resolution of each of the respective output video streams based on the various individual client device characteristics. Accordingly, claim 17 is allowable.

New dependent claim 30 recites the capability to dynamically update characteristics of the frames of data in response to changes in either or both channel conditions or client device conditions. These are features that are not found in the cited references, since the cited references send only a single output video stream that is commensurate to only one client. Dependent claim 30 further recites the feature of being capable to increase bandwidth if either or both channel conditions or device conditions permit. Thus, it is possible to increase the resolution, bit rate, or other characteristics of the particular output video streams if conditions will allow the improvements in quality.

New dependent claim 31 recites the capability to change spatial bandwidth used by the frames differently for each session corresponding to each output video stream. Thus, if each output video stream corresponds to particular groups of client devices that will receive their respective different output video streams, the spatial resolutions in such output video streams can be changed differently in accordance with the particular client device characteristics and/or based on other factors, such as different encoding formats. These are features that are not found in Guetz because of the simplistic nature of the scalable Guetz technology that does not provide multiple unique output video streams.

New claim 32 recites that the frame rates can be changed to improve quality, wherein the frame rate can be reduced differently for each session and based on respective encoding formats and client device characteristics. Claim 32 also recites the capability to increase the frame rates of at least some of the output video streams in response to changes in either or both the client device characteristics or channel conditions.

Dependent claim 20 recites that the bit depth can be changed to any bit depth, rather than being restricted to any particular predetermined or preset quantities. Dependent claim 21 recites the capability to update the frame rate dynamically during a session.

An Information Disclosure Statement, form PTO-1449, and copies of the references listed therein are included along with this amendment. These references were cited from co-pending application(s) owned by the assignee of the present application. These co-pending applications are identified in the Information Disclosure Statements.

The applicants would like to draw the Examiner's attention to the patents issued to Perlman (U.S. Patent No. 6,141,693) and Chaddha (U.S. Patent No. 5,768,535). These references were cited in a first Office Action for one of the co-pending applications, and were used as a basis for rejection of the claims under 35 U.S.C. § 103. The assignee will be filing a response to this Office Action that argues against the rejection. For purposes of the present application, the applicants' position is that the amended claims distinguish over Perlman and Chadda for a variety of reasons.

Perlman, in contrast to what the applicants have disclosed, relates to a completely different type of technique. Perlman provides an apparatus and method for combining digital data with a video stream and then using the digital data to modify or augment video frames in the video stream. A reading of the description of transcoding in Perlman in column 6, lines 20-42 might superficially suggest that Perlman performs similar operations as the embodiments disclosed by the applicants in the present application. However, this is not the case. There are substantial differences to note.

First, Perlman does not use multiple transcoders to provide multiple different output video streams. Rather, Perlman uses a single transcoder that provides a single output video stream. *See, e.g.*, Figure 4 of Perlman. Therefore, in the method and apparatus of Perlman, all client devices receive the same output video stream from the server 5. Nowhere does Perlman disclose, teach, or suggest providing a plurality of transcoders that respectively provide different output video streams to their respective client devices.

Second, Perlman uses a different technique to modify its input video stream, which is different from the techniques disclosed by the applicants. In columns 9 and 10 of Perlman, for example in the context of filtering, the server-side process involves identification of regions of an individual frame that is filtered. The entire frame itself is not filtered, because doing so would increase computational complexity. Rather, a region of the frame that is most likely to cause artifacts for all or most client devices is identified. The region identification information is sent as auxiliary data along with the single output video stream to all client devices. The client devices receive the output video stream and the auxiliary data, and use the auxiliary data to identify which region in the frame needs to be filtered to remove the artifact or

to prevent it occurrence. The client device then performs the appropriate filtering of that specific region. Perlman explains in column 10, lines 49-55 that using this technique reduces the processing requirements of the client device. It is clear, as a result, that the client devices of Perlman each perform their own customization, but nevertheless, they all receive the same data from the server 5.

Therefore to summarize, Perlman does not provide a plurality of transcoders that respectively provide different output streams of video data for different client devices; Perlman provides a single identical output video stream for all client devices; the client devices of Perlman perform the actual transcoding or processing of the output video stream, instead of the server; and Perlman nowhere discloses, teaches, or suggests the capability to dynamically change characteristics of a plurality of output video streams based on changing characteristics of the communication channel and/or client devices.

In the co-pending application the Examiner has cited Chaddha to support the missing teachings of Perlman. More specifically, the Examiner has cited Chaddha as disclosing techniques for subsampling and dropping of frames. However, the teachings of Chaddha do not cure the deficiencies of Perlman.

Chaddha provides a video delivery system that provides end-to-end video encoding such that the server outputs a single embedded data stream from which decoders may extract video having different spatial resolutions, temporal resolutions, and data rates. *See, e.g.*, column 2, lines 44-48 of Chaddha. In particular, Chaddha provides a scalable video delivery system, and does not provide the multiple unique output video streams of the applicants' embodiment(s).

In this scalable video delivery system of Chaddha, a base layer and first and second enhancement layers comprise the single embedded bit stream that may be multicast to client devices. *See, e.g.*, column 3, lines 23-26 of Chaddha. Each and every client device receives the same embedded bit stream.

To provide the customized video for each client device, each client device decodes the base layer, and then uses error data in the first and second enhancement layers to enhance the quality of the received video data. Thus, for instance, for certain client devices

decompressing only the base layer and up to the first enhancement layer may be all that is required to obtain sufficient viewing quality of the video. However, with other client devices, decoding and decompressing up to the second enhancement layer or additional enhancement layers may be required.

In short, Chaddha is similar to Perlman in that all client devices receive the identical set of output video data from the server, and then each client performs processing on the received data in order to customize that received video data to the particular requirements or capabilities of the client device. This is clearly different from the disclosed embodiments of the applicants, wherein a plurality of transcoders are used to respectively provide a plurality of different output streams that are each tailored or customized to their respective client devices. In the applicants' embodiments, as described above and disclosed in the specification, the substantial processing (including transcoding) is performed at the server side, so that the client devices already receive video streams that are already respectively tailored or otherwise customized. Therefore, all pending claims in the present application are allowable over the references.

The requisite fee for the extension of time, the additional claims, and the Information Disclosure Statement is included along with this amendment. Also included is a set of Power of Attorney documents. It is kindly requested that all future communications be directed to the undersigned attorney at the contact address and telephone number indicated in the power of attorney forms.

Overall, none of the references singly or in any motivated combination disclose, teach, or suggest what is recited in the independent claims. Thus, given the above amendments and accompanying remarks, the independent claims are now in condition for allowance. The dependent claims that depend directly or indirectly on these independent claims are likewise allowable based on at least the same reasons and based on the recitations contained in each dependent claim.

If the undersigned attorney has overlooked a teaching in any of the cited references that is relevant to the allowability of the claims, the Examiner is requested to specifically point out where such teaching may be found. Further, if there are any informalities

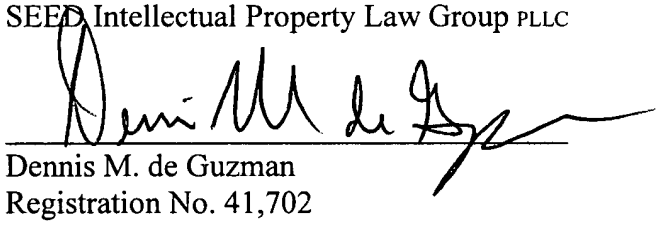
or questions that can be addressed via telephone, the Examiner is encouraged to contact the undersigned attorney at (206) 622-4900.

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,

SEED Intellectual Property Law Group PLLC



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